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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

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In the Matter of the Implementation of Smart Grid Technology	GN Docket Nos. 09-47, 09-51, and 09-137

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COMMENTS OF EMETER CORPORATION ON NBP PUBLIC NOTICE #2:
"ON THE IMPLEMENTATION OF SMART GRID TECHNOLOGY"

October 2, 2009

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eMeter Corporation hereby submits comments to the Federal Communications Commission (FCC) on the implementation of Smart Grid Technology. As a leading vendor of meter data management (MDM) software, web-based consumer engagement products, and Smart Grid management solutions, eMeter offers particular expertise in the area of real-time access to metered usage data.

eMeter's software products enable the real time exchange of metered consumption data, customer information and pricing data in utility business processes. eMeter's MDM provisions the in-home displays, home area networks, automated messaging and web portals driving demand response programs (including our own web-based consumer engagement platform).

We have limited our comments to the section entitled "Real-time Data." Our responses to the questions put forth in the request for comment follow.

Real-time Data. *The Smart Grid promises to enable utility companies and their customers to reduce U.S. energy consumption using a variety of technologies and methods. Some of the most promising of these methods use demand response, in which utility companies can directly control loads within the home or business to better manage demand, or give price signals to encourage load shedding. Other methods reduce energy consumption simply by providing consumers access to their consumption information, via in-home displays, web portals, or other methods. Central to all of these techniques is energy consumption and pricing data.*

We would first like to define what we mean by the term "real-time" and discuss the alternative understandings of this term.

Real-time data is useful to utilities and consumers when the data is actionable "right now". Power outages are actionable events and communicating real-time outage data to utility business systems helps speed power restoration. Consumers of energy value real-time energy usage data presented on an in-home display as they see the impact of switching on/off loads. Systems or products like programmable communicating thermostats that have automated responses to price changes or load control services add value to real-time data that communicates these prices or control commands.

Periodic collection of interval data by AMI systems is sometimes referred to as "real time data" but this is a misnomer as the data is typically collected several times daily (e.g. every 8 hours) and the latency of the information in the data is sometimes hours rather than minutes. While the data is "high resolution" (e.g. 15 minute intervals of usage) the data is not "real time".

To understand the delay it helps to know the data collection process. Consumption reads from interval meters can be sent every 15 minutes to data collectors which transmit the data to software head-end systems at the utility. This data must be correlated with meter IDs and premise information. The continuity and authenticity of the data must be checked, and if there are missing or aberrant reads, these must be estimated until they can be confirmed. This process of providing complete and accurate data is known as Verification, Validation and Estimation, or VEE; it is usually performed by the Meter Data Management system. Before metered usage data can be sent to other utility back end systems to determine billing or load management decisions, it must undergo VEE. Utilities may choose to perform VEE continuously in real time, or to conduct this process late in the day so as not to tie up information technology processes during business hours. Most utilities choose the latter method because of technological constraints. Thus, data may be collected in "real time", yet not be made available for use until several hours later. However, Smart Grid meter data management software like eMeter's EnergyIP™ provides "real time" processing of data including VEE and event processes based on its immediate handling of the data as it is received from the meter reading or data collection systems. This real time processing ensures that there is no added latency to periodic interval data collection or to real time events such as an outage or an on-demand read.

Utilities prefer not to release customer usage data until it has been through the VEE process, to ensure that the customer's usage reads correspond with the reads used as billing determinants. From a customer service perspective, it is also more effective to present usage in a way the customer understands. At minimum the data can be regrouped by price period or rate period, and calculated as cost, before being offered to customers. More heuristic web presentment software solutions use graphical interfaces to interpret the data in order to invite customer engagement. These also add more steps to the handling of usage data before it reaches the consumer.

For the purpose of our comments to the FCC, eMeter will define "real-time data" as data that is presented for use by an application where the latency between the event or energy consumption described by the data is very low, typically a few minutes or seconds. For example a power outage event is represented as "real-time" data when the data describing the power outage (e.g.

circuit location and start time of the outage) is communicated within a minute of the occurrence as compared to a historic log of the event that may be read from a meter many hours after the power outage started. Real-time data can also represent energy usage that is communicated to an application or user within a few seconds or minutes of the energy use. For example if a meter is recording energy use in 15 minute intervals the delivery of that energy use within a few minutes of the end of the 15 minute interval would be considered "real time data".

   a. *In current Smart Meter deployments, what percentage of customers have access to real time consumption and/or pricing data? How is this access provided?*

eMeter is either directly involved with or aware of 25 utilities in the United States who plan to provide their customers with access to their individual interval usage data via web-based solutions. These utilities plan to equip roughly 16.7 million end users with smart meters over the next four years.

- Among the utilities surveyed, the percentage of customers currently accessing real time usage data is not significant. In our assessment, only 800 customers from one utility currently have access to real time consumption and pricing data – less than half of a hundredth of a percent.
- For 35% of these 16.7 million customers, plans are solidly in place to provide access to consumption and pricing data through web presentment or in-home displays. Twelve of the utilities in our survey have solid plans (in the form of vendor RFPs) to provide this capability.
- For 65% of these 16.7 million customers, there is utility interest, but no solid plans, to provide web access to usage data once metering capabilities are in place. Another twelve of the utilities surveyed stated in rate cases or public statements that once AMI capabilities were installed, they would consider providing web presentment of real time consumption and pricing data to all customers with smart meters.

It should be noted that our survey does not include California utilities, whose progress in this matter are documented on the website of the California Public Utilities Commission, or on utility websites.[1] While each utility has plans to present web-based access to real time consumption and pricing data to customers with smart meters, and San Diego Gas & Electric has begun solving the problem of providing that data to third parties who will present the data to customers to promote energy awareness, none of the California projects currently have a significant number of customers accessing their usage data in real time.

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[1] Southern California Edison:
http://www.sce.com/PowerandEnvironment/smartconnect/default.htm?from=redirect;
Latest PG&E Smart Meter Upgrade progress report:
https://www.pge.com/regulation/SmartMeterProgram-Upgrade/Other-Docs/PGE/2009/SmartMeterProgram-Upgrade_Other-Doc_PGE_20090715-01.pdf
San Diego Gas & Electric, latest Technical Advisory Panel report, April 2009:
http://www.sdge.com/documents/smartmeter/SM-TAP-4-29-09.pdf

b. *What are the methods by which consumers can access this data (e.g., via Smart Meter, via a utility website, via third-party websites, etc.)? What are the relative merits and risks of each method?*

The 800 customers referenced above have access to real time data because they are participants in the PowerCentsDC™ pilot project in Washington, DC. PowerCentsDC participants have been equipped with smart meters supported by an AMI communications network and, in some cases, programmable communicating thermostats (PCTs, or "smart thermostats"), for the purpose of testing a residential demand response program utilizing dynamic pricing. For these customers, the price of electricity can change hourly, which gives them incentive to access usage and price data. They receive price signals, cumulative energy costs, and usage totals on programmable communicating thermostats in their homes. These thermostats can also be programmed to respond automatically to price spikes. Customers also receive notifications of price signals on their cell phones or through emails. In July 2009, they also were given the option of subscribing to a web site where they could see their personal cost, usage and carbon emissions, along with actionable tips on ways to reduce each category.

c. *How should third-party application developers and device makers use this data? How can strong privacy and security requirements be satisfied without stifling innovation?*

To use the example of PowerCentsDC again, after the meter data management software has collected raw usage data from the head end system and performed VEE, the validated meter data is provided back out to smart thermostats on the customer premises. The thermostat can display cumulative usage, cumulative cost, and current price, updated hourly by the utility. The usage data is sent over dedicated AMI communication networks using proven encryption methods, and even if they were to be intercepted, without network keys the data could not be correlated with private and personal information.

A third-party application developer is also using the validated meter data to build a rich web presentment solution to provide PowerCentsDC customers with not only their usage but also context, education and actionable tips, via informative graphical interfaces and engaging messages. Customers who subscribe to the web service must undergo security practices standard to registration and login procedures on private, secure websites.

d. *What uses of real-time consumption and pricing data have been shown most effective at reducing peak load and total consumption? We welcome detailed analyses of the relative merits and risks of these methods.*

The PowerCentsDC pilot is also a good example of the types of methods by which customers can access their real time usage data for the benefit of achieving mass market Demand Response (DR). The success of DR programs depends on the customers' ability to respond to a price signal

or event trigger. There are several channels used to communicate critical information with enough time to respond.

- In the case of basic TOU rates that have daily price changes on an unchanging schedule, customers must be informed and reminded about the changes in price periods. The most effective media channel has been shown to be a very low-tech tool: a refrigerator magnet or sticker. When placed in areas where peak load shifting behavior is easiest to capture – the kitchen, or the laundry room, for example – the humble magnet achieves the powerful aim of reminding consumers to wait for off-peak times to use electricity. This encourages habitual peak load shifting behavior with long-term benefits for the grid.
- In the case of system emergencies or critical peak events and the need to convey a widespread public appeal to curtail energy usage, announcements on local television, radio, newspaper, and electronic bulletins (websites) have been successful. California's "Flex Your Power" campaign, an energy conservation initiative, uses a "Flex Your Power NOW" message for statewide DR events. Triggers are based on load projections from the California Independent System Operator (CAISO), and public services messages are issued through TV, radio and print media channels 24 hours before a potential threat to reliability.
- In the case of Critical Peak (CP) programs, customers are given the option to sign up for personal notifications. Standard practice now is to offer outgoing messages 24 hours before a CP event via automated phone messaging, SMS texting, or email. The trending preference seems to be text messages on cell phones, followed by email notification. Most participants in DR programs choose more than one method of communication, to more than one household member.
- There is a burgeoning industry producing in-home display devices that convey the current electricity price and usage with a signal from the utility. These include smart thermostats that display usage and cost, sometimes also automating thermostat adjustments in response to utility signals, as well as stand-alone devices displaying usage and cost data numerically or graphically. These devices are often designed to work with the Home Area Network (HAN) interface now built into most smart meters.
- Subscription-based web presentment of usage and cost data, usually updated up through midnight of the previous day.

DR for C&I customers has long been confirmed as an effective load balancing resource for Independent System Operators in large markets such as the PJM service territory, MISO, and California. As for the residential sector, the overwhelming conclusion from pilot projects is that

customers respond well to time-based pricing[2]. When usage and cost information is made transparent and simple, not only do customers understand and accept dynamic rates, they also shift power off peak to achieve reductions typically between 10 and 20 percent, but reaching over 50 percent when coupled with automated response (see figure).[3]
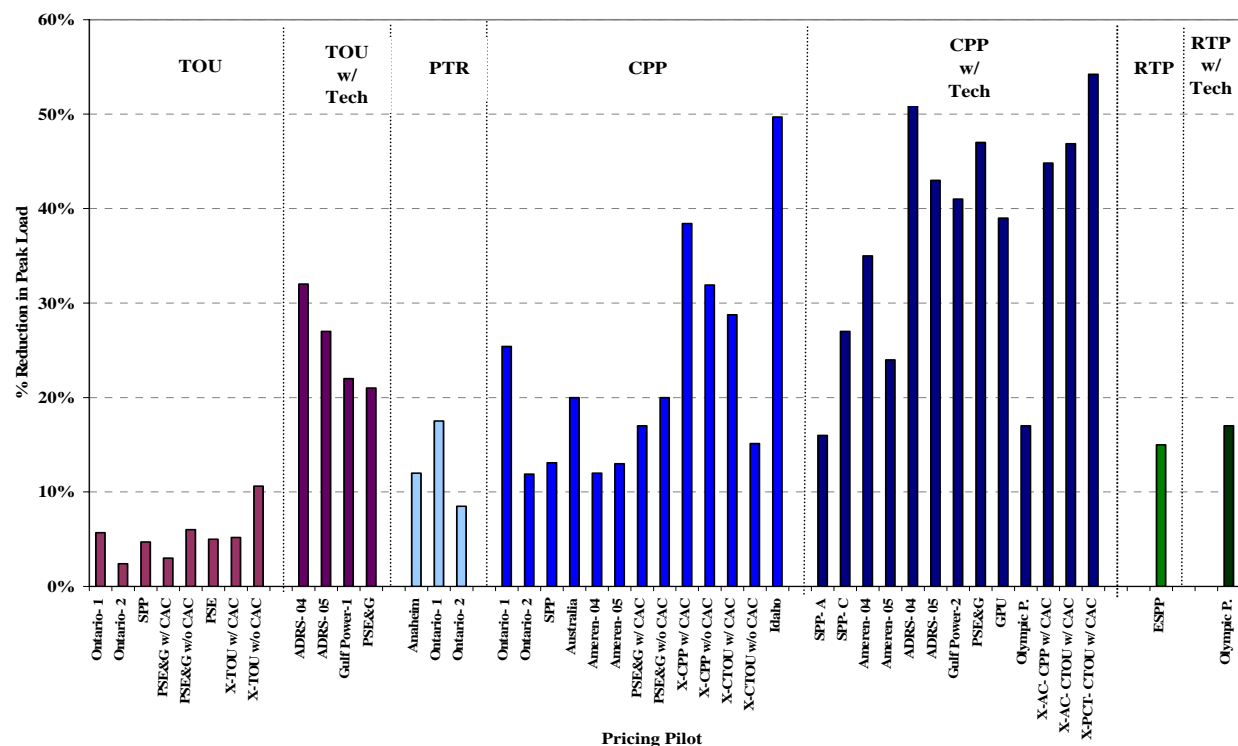
e.   *Are there benefits to providing consumers more granular consumption data? We welcome studies that examine how consumer or business behavior varies with the type and frequency of energy consumption data.*

While habitual load shifting is just as important as emergency response, an effective solution to reducing peak load must include ways to communicate critical event information in a timely manner to consumers. The preferred frequency and media of notification channels vary with regional or social demographics, and with the urgency of peak load constraints. Customers on Idaho Power's residential rate pilot preferred extra feedback on their monthly printed bills and were still able to shift load; however, reliability and resource constraints were not as much of a threat to this population. By contrast, Ontario province had already been engaged in public education about resource constraints and aggressive conservation goals when TOU rates were tested. Customers in several of Ontario Province's rate pilots cited refrigerator magnets and bills as their primary motivation for load shifting, but pilot results showed that customers on

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[2] King, Chris and Chatterjee, Sanjoy, "Where's the Beef?", *Public Utilities Fortnightly*, July 1, 2003.
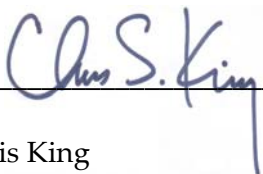
[3] Ahmad Faruqui, "The Emergence of Dynamic Pricing," Presentation to the NYISO Board, September 13, 2009.

critical peak programs achieved higher levels of curtailment during peak times. Reviews indicate that real time feedback on the impending consequences of energy usage (price or reliability signals through phone notifications, emails, or in-home display devices) will elicit more action on the consumers' part.

    f.   *What are the implications of opening real-time consumption data to consumers and the energy management devices and applications they choose to connect?*

Opening real-time consumption data to consumers and the energy management devices and applications they choose to connect is the logical step towards completing a Smart Grid. Just as system operators must be given transparency and insight into system conditions in order to make decisions about load distribution, end use consumers must be given transparency into their current usage in order to make decisions about consumption. Just as transmission and delivery devices can be automated to respond efficiently to system spikes or stress, end use consumers can automate thermostats or other appliances to respond to utility peak load management signals while still maintaining comfort. This creates a grid with end-to-end responsiveness and intelligence in which both producers and consumers of energy play an efficient role in grid management.

Respectfully submitted,

By: _____

Chris King
Chief Strategy Officer
eMeter Corporation
2215 Bridgepointe Parkway, Suite 300
San Mateo, CA 94404
650-227-7770 (phone)
650-227-7771 (fax)